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December 2025 Issue 24

JÄGER EnviroTech

JAEGER ENVIROTECH: REDEFINING AERATION TECHNOLOGY FOR THE FUTURE OF WASTEWATER TREATMENT

FILTRALITE®

Elevating Pretreatment Performance with Filtralite®: A High Efficiency Media for Modern Desalination Challenges

الموسى AL MOUSA
AL MOUSA TRADING CO. شركة الموسى للتجارة

Powering the Region with World-Class Pumping & Water Technologies: Al Mousa Trading Company's 2025 Journey

El-Nasr Castings Co
The leading cast iron foundry in the Middle East

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EGYPTIAN ENGINEERING COMPANY

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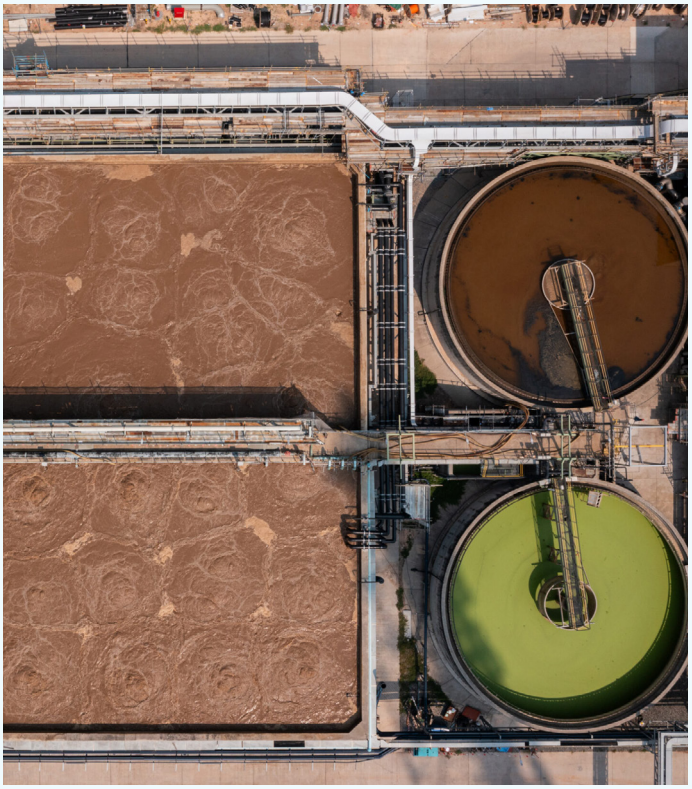

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Innovative Solutions to Achieve Sustainability in Water and Energy

From The Editor

In an era increasingly defined by resource scarcity and climate volatility, the boundaries between water management, energy efficiency, and industrial infrastructure are becoming porous. The challenges we face – from treating complex industrial effluents to stabilizing national power grids – require a convergence of mechanical ingenuity, chemical innovation, and strategic foresight. This issue explores that critical intersection, highlighting how global innovation and regional expertise are uniting to build a more resilient future.

The narrative of this edition is one of transformation and efficiency. We begin by examining technological leaps in wastewater treatment. Jaeger Envirotech is redefining aeration with its JetFlex® SSD, a smart strip diffuser designed to slash energy costs and withstand the harsh conditions of the MENA region. Similarly, Filtralite® is revolutionizing pretreatment with advanced expanded clay media, offering a robust defense for desalination plants against fluctuating water quality.

We shine a spotlight on the manufacturing powerhouses driving development across the Middle East. Al Mousa Trading Co. stands as a strategic force in Saudi Arabia, aligning with Vision 2030 to deliver critical pumping and fire protection infrastructure.

Ensuring these assets perform over their lifecycle is equally critical. We explore the role of Contrack Facilities Management (CFM), which brings integrated, ISO-certified management to complex environments, ensuring sustainability and value from day one. In parallel, we profile the resurgence of local manufacturing in Egypt.

The Egyptian Engineering Company (EEC) and El-Nasr Castings are not only producing pressure vessels and ductile iron pipes but are reducing reliance on imports and strengthening national self-sufficiency. This push for localization is further exemplified by Water Technology, which has successfully localized the manufacturing of high-quality chlorine injection systems, proving that precision engineering knows no borders.

Sustainability is the thread binding these stories together. We delve into the "circular economy" through ZENI, a pioneer harnessing microalgae to transform industrial wastewater into valuable bio-products like fertilizer. We also examine the pragmatic side of energy savings, detailing how Variable Frequency Drives (VFDs) can reduce power consumption in anaerobic digesters by over 50%. On a humanitarian level, we see how solar-powered water pumps are building resilience in vulnerable communities facing drought.

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Jaeger EnviroTech: Redefining Aeration Technology for the Future of Wastewater Treatment

For nearly five decades, Jaeger Envirotech—formerly known as Jäger Umwelt-Technik—has pioneered advanced aeration technologies that continue to shape the global wastewater treatment landscape. With full in-house control over membrane development, diffuser manufacturing, and quality assurance, the company stands at the forefront of innovation, particularly within its aeration and diffuser portfolio.

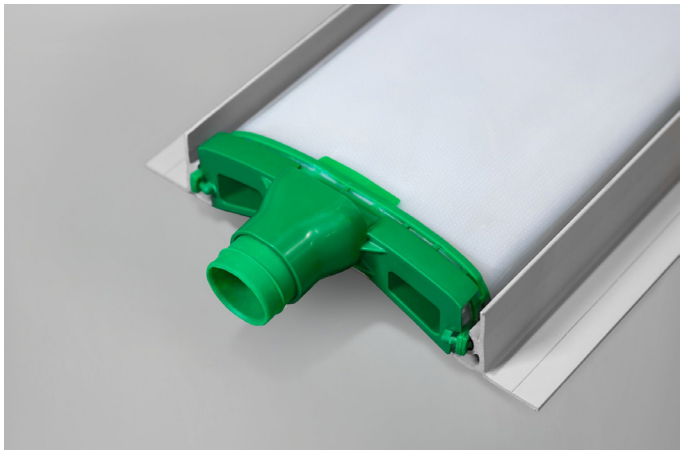
The JetFlex® SSD: The Smart Strip Diffuser That Transformed Aeration Efficiency

The JetFlex® SSD Smart Strip Diffuser represents Jaeger Envirotech's most advanced aeration solution—engineered for maximum oxygen transfer efficiency, low pressure loss, and long service life.

> "Our mission is to deliver solutions that withstand extreme environments while ensuring plant operators achieve the lowest possible total cost of ownership."

Hans-Christian von Consbruch
Managing Director

Thanks to its fully decoupled TPU membrane, continuous micro-perforation, and rapid on-site membrane replacement, the SSD is transforming how plants approach maintenance and energy optimization.



Key Advantages:

- Extremely high oxygen transfer efficiency (SOTE)
- Wide operating range (up to 52 m³/h)
- Lifetime of up to 15 years
- Fast reaction to oxygen demand peaks
- 100% recyclable membrane support body
- CO2 footprint of the product is reduced by approx. 25%
- Minimal installation piping
- Suitable for harsh MENA-region conditions

A notable reference project—Lomza WWTP in Poland—reduced energy consumption by 30% after switching from disc diffusers to SSD technology.

Disc Diffusers (HD Series): Proven Reliability and Versatility

The HD Series (JetFlex® HD 200, 270, 300, 340) combines durability, chemical resistance, and flexible membrane options (EPDM or Silicone) for continuous and intermittent aeration.

Highlights:

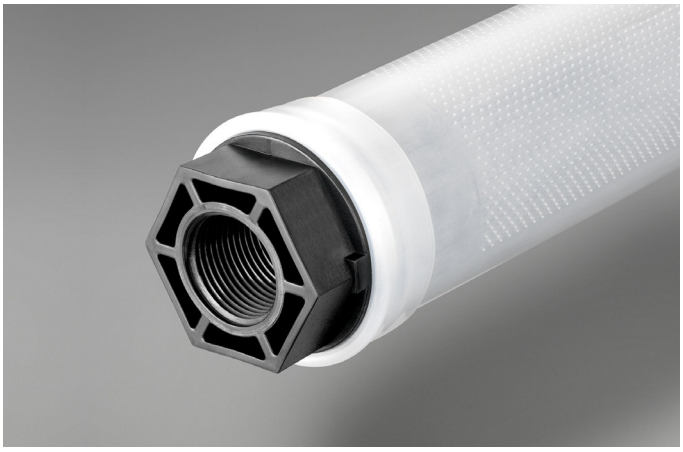
- Diverse connection options
- Chemical resistance
- Maximized oxygen transfer

Tube Diffusers (TD Series): Flexible and Efficient Across Applications

The JetFlex® TD Series offers consistent performance with multiple membrane materials and customizable perforation patterns.

Core Features:

- Diverse membrane materials
- Adaptable perforation patterns
- Diverse length and diameter
- Low head loss due to grooved PP-support tube



Coarse Bubble Diffusers: Mixing, Equalization & High-Load Performance

Jaeger Envirotech's coarse bubble diffusers—including the CBD SS (stainless steel tube) and CBD 105 (disc type)—are designed for grit chambers, equalization basins, sludge stabilization, and high-turbulence mixing zones.

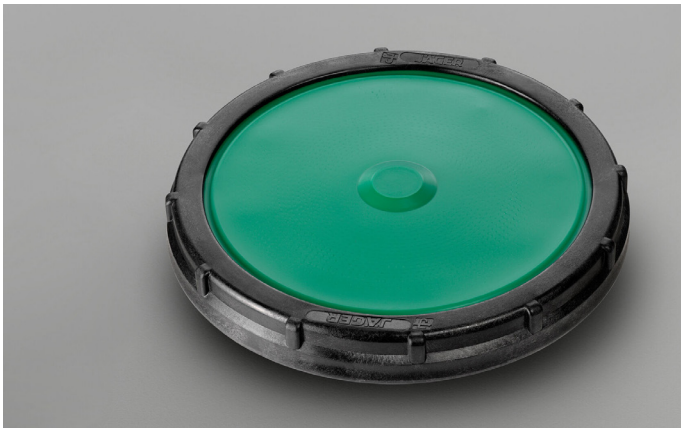
Key Strengths:

- Prevent sludge deposition
- Effective circulation
- Diverse areas of application
- High durability in corrosive wastewater
- High-temperature resistance

Dr. Eng. Ehsan Mohamed Pajooh
Sales Manager for MENA

"We don't manufacture diffusers… we engineer aeration systems that redefine efficiency and long-term operational value."

Tested, Certified, and Built for Harsh Conditions



Every diffuser undergoes rigorous testing:

- Bubble pattern analysis
- Head-loss testing
- Hardness and wall-thickness verification
- Membrane perforation inspection

These procedures guarantee consistent performance—even under MENA-region conditions like 65°C ambient temperatures, high sand loads, and corrosive industrial effluents.

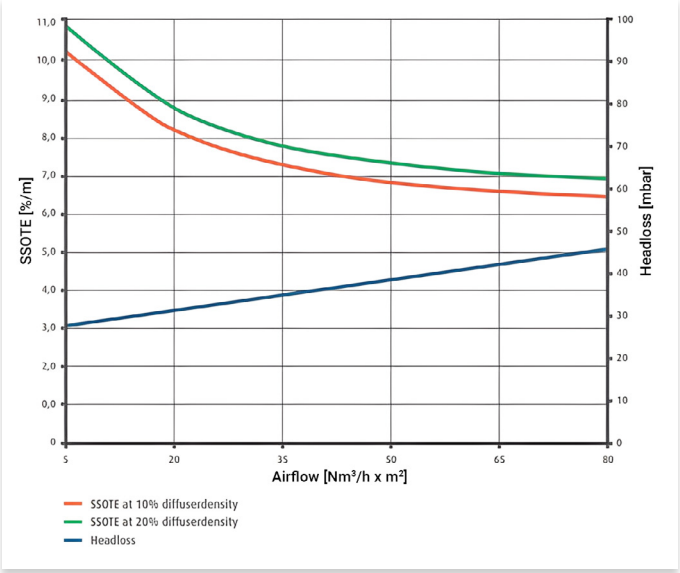
Real World Validation & Proven Performance

Jaeger Envirotech's diffuser technology is proven in real wastewater treatment plants worldwide.

• Revolution of the Strip Diffuser

Jaeger Envirotech demonstrates how its JetFlex® SSD Smart-Strip Diffuser separates the membrane from the support body, enabling fast on-site membrane replacement without removing the base structure. This reduces downtime, material usage, and costs while enabling reuse of the base body and minimizing plastic waste.

The SSD is available in strip lengths from 1.5 to 4 m, with an active area between 0.24 and 0.64 m², and supports airflow rates from 1.5 up to 52 m³/h. Its performance curve offers high oxygen efficiency at low energy cost.



• Finham WWTP (UK) Retrofit

In the Finham wastewater treatment plant, Jaeger's JetFlex® TD tube diffusers were used under a Cleartec® IFAS installation: more than 12,000 tube diffusers (TD 65 2) were mounted in 12 aeration tanks. The system increased the plant's pollutant removal efficiency and reduced energy consumption without needing to expand tank volumes — providing a cost-effective, reliable retrofit.

The benefits are clear: operators can achieve significant energy savings, lower operational and maintenance cost, and reduced carbon footprint — all while relying on proven technology with documented performance in real plants.

A Future of Sustainable Wastwater Treatment

With its advanced aeration portfolio—led by the JetFlex® SSD—Jaeger Envirotech continues to lead the industry toward more energy-efficient, reliable, and sustainable solutions.

Whether for municipal wastewater treatment, industrial effluents, lakes and rivers, or high-demand aeration processes, Jaeger Envirotech stands as a trusted global partner transforming aeration technology worldwide.

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Powering the Region with World-Class Pumping & Water Technologies: Al Mousa Trading Company's 2025 Journey

In 2025, Al Mousa Trading Co. stands as one of Saudi Arabia's most influential engineering partners, delivering advanced pumping, water treatment, HVAC, thermal, and fire protection solutions across the Kingdom.

With a robust portfolio of global partnerships, engineering expertise spanning decades, and involvement in some of the nation's most critical infrastructure projects, Al Mousa has evolved from a solutions provider into a strategic force shaping the future of water, energy, and environmental sustainability in Saudi Arabia.

Backed by relentless innovation, precision engineering, and a commitment to Vision 2030, the company continues to raise industry standards—project after project, partnership after partnership.

Global Partnerships Powering Saudi Infrastructure

• Grundfos – A Strategic Alliance Driving Pumping Innovation

As an authorized sub-factory, service provider, and main distributor of Grundfos, Al Mousa delivers the region's most advanced pumping technologies.

Key Solutions:

• **SL/SE wastewater pumps:** High efficiency, long-life operation—core components of municipal sewage systems.

• **MAGNA circulators:** Smart, magnetic motor design for HVAC and cooling systems.

• **TPE3 vertical in-line pumps:** Intelligent flow control for modern district energy, heating, and cooling applications.

• **NK end-suction pumps:** High-capacity performance for industrial and infrastructure use.

• **LS/LSV split case pumps:** Horizontal and vertical configurations for large-volume water transfer.

Major 2025 Achievement – Arar University Pump Witness Test

A comprehensive witness test was conducted at Al Mousa's facility in Riyadh for the Arar University Project, verifying:

• Flow & Head
• Pump Efficiency
• Power Consumption (kW)
• Amperage & Voltage
• NPSH
• Vibration Levels
• RPM Accuracy

All units performed exceptionally, confirming reliability for long-term operation.

• Viessmann – German Heating & Energy Excellence

Through its partnership with Viessmann, Al Mousa provides cutting-edge heating, cooling, and energy-efficient thermal systems.

Key Benefits:

• Lower energy consumption
• Durable German design exceeding 100 years of innovation
• Reduced environmental footprint
• Ideal for residential, commercial & industrial installations

In 2025, Viessmann and Al Mousa strengthened their collaboration during a strategic meeting in Riyadh, exploring opportunities for regional growth and product expansion.

• Filtralite® – Advanced Water Filtration for a Sustainable Future

Al Mousa's partnership with Filtralite® supports sustainable water treatment across the Kingdom.

Solutions Include:

• Filtralite® Clean
• Filtralite® Pure

These porous, lightweight expanded clay media significantly:

• Improve biological treatment
• Enhance physical filtration
• Reduce operational costs
• Increase filtration capacity

Together, the companies contribute to national water sustainability goals aligned with Vision 2030.

• Wilo – High-Performance Pressure Boosting & Multistage Solutions

Al Mousa supplies a full range of Wilo engineered systems, including:

- Wilo Helix V Features:

• Vertical multistage design
• Stainless steel hydraulic components (AISI 304 / 316L)
• IE3/IE4 high-efficiency motor options
• Certified for drinking water
• Ideal for pressure boosting, cooling, and industrial applications

- Helix Booster Pumps:

• Advanced laser-welded hydraulics
• Durable construction
• Applications in irrigation, fire suppression, industrial processes, and municipal systems

• SPP Pumps – Fire Protection You Can Trust

Through its collaboration with SPP, Al Mousa supplies certified firefighting pump sets for large-scale infrastructure.

Key Capabilities:

• Horizontal split case pumps
• Electric or diesel drive options
• Flow rates up to 9,000 m³/h
• Heads up to 300 m
• Stainless steel impellers

Successfully deployed in major 2025 projects.

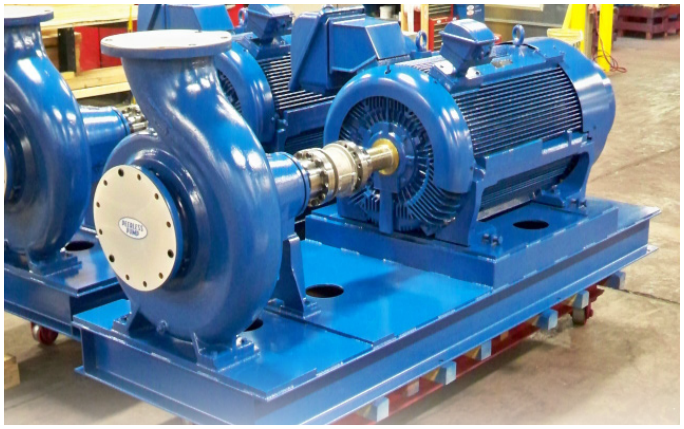
• Peerless Pump – Global Leader in Fire Protection Systems

As an authorized distributor, Al Mousa provides UL/FM-approved fire pumps built for critical emergency systems.

Solutions include:

• Supply
• Installation
• Testing & commissioning
• After-sales service

Ensuring safe and fully compliant fire systems for industrial, commercial & infrastructure projects.



Major Projects Delivered in 2025

• Masar Makkah Development – Car Park Firefighting System

A flagship accomplishment in 2025.

Scope Delivered:

• Supply of 4 certified SPP fire pump sets
• Full supervision during installation
• Testing & commissioning per international fire standards

This milestone highlights Al Mousa's ability to support complex, high-profile megaprojects.

• Arar University – Grundfos Pump Performance Verification

At Al Mousa's Riyadh facility, comprehensive witness testing validated:

• Hydraulic performance
• Efficiency
• Power draw
• Electrical compliance
• Vibration & suction conditions

All units passed successfully—ensuring optimal performance for the university's infrastructure systems.

• Dallah Health Care Medical Complex (Al Arid – Riyadh)

A key MEP supply success in 2025.

Scope Included:

• Supply of D Blue piping systems
• Acoustic soil & waste drainage system
• HDPE and chemical-resistant piping
• Compliance with safety & quality standards

The result: A reliable, long-lasting drainage network for a major medical facility.

• Jazan Expansion – New Regional Office Opening

Al Mousa opened a new office in Jazan, strengthening its presence across southern Saudi Arabia and enhancing service response times for clients.

• Multiple Additional Engineering Deliveries

Throughout 2025, Al Mousa supported various sectors—residential, commercial, industrial—with solutions including:

• Booster pump stations
• HVAC pump systems
• Wastewater pumping packages
• Filtration & treatment solutions
• Thermal systems using Viessmann technology

Comprehensive Engineering Services Delivering End-to-End Excellence

- Installation – Precision That Defines Performance

Al Mousa ensures every system is installed with engineering precision:

• Accurate alignment
• On-site adjustments
• System optimization
• Performance testing

Proper installation minimizes downtime and maximizes system lifespan.

- Testing & Commissioning – Ensuring Readiness from Day One

Services cover:

- Pumps & motors
- HVAC systems
- Firefighting networks
- Water treatment
- Sewage systems
- Thermal & district cooling networks

Every test is conducted under certified procedures and documented thoroughly.

- Maintenance – Protecting Assets and Extending Lifespan

Al Mousa offers:

- Annual maintenance contracts
- Preventive maintenance
- Emergency repairs
- Genuine spare parts
- Long-term operational support

Ensuring stable performance, reduced failures, and optimized energy usage.

Complete Product Portfolio for Every Sector

- Pumping Solutions

- Submersible pumps
- Sewage pumps
- Booster systems
- End-suction pumps
- Horizontal & vertical split case pumps
- Multistage high-pressure pumps

- Firefighting Systems

- UL/FM fire pumps
- Jockey pumps
- Pump controllers & panels
- Diesel & electric configurations
- NFPA-compliant installation & testing

- Water Treatment & Filtration

- Biological & physical filtration media
- Tertiary water treatment
- Filtration systems powered by Filtralite® technology

- Thermal & Heating Systems

Powered by Viessmann:

- Boilers
- Calorifiers
- Solar heaters
- Energy-efficient heat generation solutions

- HVAC Water Systems

- Chilled & hot water circulation pumps
- In-line centrifugal pumps
- MAGNA smart circulators
- High-efficiency booster sets

- Piping & Flow Solutions

- PPR
- HDPE
- PEX
- Acoustic soil systems
- Complete piping accessories and fittings

Supporting Vision 2030 Through Smart, Energy-Efficient Engineering

Al Mousa's 2025 strategy aligns perfectly with national priorities:

Focus Areas:

- Reducing energy consumption in pumping systems
- Improving operational efficiency
- Lowering maintenance costs
- Extending asset lifespan
- Delivering sustainable water solutions

Through partnerships with global leaders like Grundfos, Wilo, Viessmann, SPP, Peerless, Filtralite, and George Fischer, Al Mousa contributes directly to Saudi Arabia's transition toward green infrastructure and resource optimization.

A Forward-Looking Vision for 2025 and Beyond

Al Mousa Trading Co. continues its mission to be the trusted engineering partner of choice in Saudi Arabia.

Strategic Goals:

- Expand regional presence
- Strengthen aftermarket services
- Develop local technical expertise
- Support large-scale infrastructure growth
- Deliver sustainable water and energy solutions

Conclusion

In 2025, Al Mousa Trading Co. is not simply supplying pumps, pipes, and systems—it is building the backbone of Saudi Arabia's water and energy future.

With strong global partnerships, landmark national projects, engineering excellence, and a vision aligned with the Kingdom's ambitions, Al Mousa continues to drive innovation, reliability, and sustainability across every sector it serves.

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Al Mousa Trading Co. 2025: A Leader in Innovation and Global Partnerships

In 2025, Al Mousa Trading Co redefines engineering in Saudi Arabia with innovative solutions in water pumping, treatment, and HVAC systems. Collaborating with strategic partners like Grundfos, Viessmann, Filtralite, Wilo, SPP, and Peerless, the company addresses national infrastructure needs.

Key Achievements Include:

- Firefighting System at Masar Makkah
- Pump Performance Verification at Arar University
- Dallah Health Care Medical Complex (Al Arid – Riyadh)
- New Office Opening in Jazan

Committed to Vision 2030, Al Mousa focuses on sustainability and energy efficiency.

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FILTRALITE®

Elevating Pretreatment Performance with Filtralite®: A High Efficiency Media for Modern Desalination Challenges

Desalination and advanced water treatment plants face increasingly unstable feedwater conditions—fluctuating salinity, high suspended solids, tidal-driven variability, and sudden spikes in turbidity. These challenges put significant strain on ultrafiltration (UF) and reverse osmosis (RO) systems, accelerating fouling and raising operational costs.

In this environment, robust and reliable pretreatment becomes essential. Filtralite® provides a high-performance solution that stabilizes feedwater quality, protects membranes, and improves overall system efficiency.

About Filtralite®: High-Performance Expanded Clay Media

Filtralite® is engineered from lightweight expanded clay aggregates, offering:

- Typically provides high porosity and a macropore structure
- Generally enables higher filtration velocities compared to conventional sand/anthracite
- Can reduce backwash frequency, often requiring 2–4× fewer cycles depending on system conditions
- Helps improve the removal of fine suspended solids
- Can extend media life while reducing overall energy and water consumption

These performance characteristics make it an ideal media for desalination pretreatment, especially in high-variability environments.

Case Study: Beckton Desalination Plant, UK

• Background: A Highly Variable Estuarial Water Source

The Beckton desalination plant in the UK treats estuarial water with rapidly changing turbidity levels, suspended solids, and salinity driven by tidal conditions.

These fluctuations made it critical to develop a pretreatment solution that could protect the UF and RO stages reliably.

• Pretreatment Configuration at Beckton

The pretreatment train consists of:

1. Coagulation & Flocculation
2. Clarification
3. Pressure Filtration using Filtralite® Pure HC 0.8–1.6 mm
4. Ultrafiltration
5. Reverse Osmosis (RO)

Raw Water → Coagulation → Clarification → **Filtralite® Pressure Filters** → UF → RO → Product Water

• Filtration System Details

• 17 pressure filters
• 50 m² filtration area per filter
• **Filtration velocity:** 12 m/h
• **Media used:** Filtralite® Pure HC (0.8–1.6 mm)

• Performance Results

The use of Filtralite® significantly improved pretreatment stability:

• Consistent turbidity reduction even during raw water fluctuations
• Stable UF membrane performance with reduced clogging
• Lower fouling rate for RO membranes
• Reduced backwash water and energy consumption
•High-quality filtrate meeting strict plant and regulatory standards

The plant achieves a production capacity of **150,000 m³/day**, serving nearly **900,000 people.**

• Table: Performance Comparison

Parameter	Conventional Media	Filtralite®	Improvement
Filtration rate	6–8 m/h	10–12 m/h	+50–70%
Backwash frequency	High	Low	2–4× reduction
Fine particle removal	Moderate	High	Significant improvement
UF fouling	Frequent	Reduced	Lower OPEX

"Data reflects common operating conditions in reference filtration systems."

Why Filtralite® Is Ideal for MENA Desalination Plants

Plants in the Middle East & North Africa can benefit from Filtralite® due to:

- Ability to handle high-turbidity or variable raw water
- Reduced operational cost through fewer backwashes
- Enhanced UF and RO membrane protection
- Upgrade potential for existing plants without new construction
- Lower carbon footprint and improved sustainability

Additional Insights: Operational & Sustainability Advantages

> Filtralite® improves filtration performance while supporting broader plant efficiency. Its lower head-loss development enables longer filtration cycles, reducing backwash water, chemical use, and energy demand.

At sites like Beckton—where environmental compliance and operational stability are essential—these reductions become impactful. The media's lightweight composition also eases structural loadings and cuts transportation-related emissions, offering a more sustainable and cost-effective solution for large desalination and estuarial facilities.

Enhanced Applicability in Different Water Treatment Contexts

Filtralite® delivers reliable performance across municipal drinking water, industrial reuse, and tertiary polishing, especially in plants facing variable turbidity. Its robustness has driven increased adoption in the Middle East, Europe, and Asia, where stricter standards require stable filtration. In many retrofits, it can replace conventional media without structural changes, allowing capacity and performance upgrades using existing infrastructure.

Conclusion

Filtralite® enables desalination and water treatment plants to achieve stable, efficient, and high-quality pretreatment performance—even under challenging feedwater conditions. The Beckton case demonstrates how advanced media can transform plant reliability, reduce OPEX, and extend membrane life. This makes Filtralite® a strategic, future-focused choice for pretreatment systems across the globe, especially in high-demand regions like the Middle East.

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FILTRALITE®

Upgrade Your Pretreatment.Protect Your Membranes. Boost Your Performance.

In today's challenging desalination environment—where turbidity spikes, salinityshifts, and feedwater instability are the new norm —traditional filtration is no longer enough.

Filtralite® delivers a next-generation solution built for reliability, efficiency, and long-term membrane protection.

- -Higher filtration rates
- -Lower energy and water consumption
- - 2–4× fewer backwashes
- - Stronger UF & RO protection

From Europe to the Middle East, Filtralite® is proving to be the future of pretreatment.

Filtralite® — Smarter. Stronger. More Sustainable.

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Improving Efficiency in Sludge Treatment: Innovative Solutions for Filter Press Manufacturers

In an era where sustainability and operational efficiency are increasingly important, filter presses serve as the backbone of solid-liquid separation processes in wastewater treatment. These presses play a vital role across various industries, including municipal wastewater management, chemical processing, and food production. However, despite their significance, many manufacturers face significant challenges regarding equipment efficiency and production processes.

Innovation in Sludge Treatment: A Step Towards the Future

As environmental pressures and sustainability requirements rise, innovation in sludge treatment has become crucial. Industries today need effective solutions to address the growing challenges of water and waste management. In this context, companies strive to improve their operational efficiency and minimize their environmental impact. Filter presses emerge as a key solution, playing a pivotal role in achieving this goal.

By adopting new technologies and innovative applications, filter press manufacturers can enhance their efficiency and achieve better results, positioning themselves at the forefront of efforts to protect the environment and improve water quality.

The Importance of Filter Presses in Wastewater Treatment

Filter presses are essential for separating solids from liquids in wastewater treatment processes. Their versatility allows them to be used in diverse applications, from municipal wastewater treatment to industrial processes such as coal washing and cement production. However, these systems often suffer from issues related to sludge volume and disposal difficulties.

Challenges in Sludge Management

Managing sludge is one of the biggest challenges facing filter press manufacturers. In recent years, the development of sludge treatment technology has lagged behind expectations, particularly in regions like China.

This delay has resulted in excessive sludge generation and water production, leading to significant environmental impacts if not managed properly. The challenges include:

- **Excessive Sludge Generation:** Inefficient processes contribute to high volumes of polluted sludge.
- **Dewatering Inefficiencies:** Incomplete dewatering results in increased waste and disposal difficulties.
- **Resource Utilization:** Poor resource management exacerbates environmental issues.

Identifying the Need for Improvement

A leading filter press manufacturer recognized the necessity for a comprehensive system upgrade to increase operational efficiency and minimize waste. A thorough assessment of the existing production system revealed that flocculant was being dosed into the sludge filter press using a screw pump. While this method improved efficiency, it lacked precision, leading to excessive chemical usage and increased sludge waste.

Critical Challenges Uncovered

- **Inaccurate Dosing:** The screw pump's lack of precision resulted in over-dosing of flocculants.
- **High Power Consumption:** Existing equipment required significant power, contributing to operational costs.
- **Maintenance Challenges:** The current setup had considerable maintenance requirements, affecting overall efficiency.

Innovative Dosing Solutions

To tackle these issues, the manufacturer collaborated with a water-treatment expert to implement advanced chemical dosing solutions. Two main options were considered: mechanical diaphragm pumps and air-operated double diaphragm (AODD) pumps.

• Solution I: Mechanical Diaphragm Pumps

The first recommendation was to replace the existing screw pumps with mechanical diaphragm pumps, specifically the Kosmo Series. These pumps offer several advantages:

- **Precision Control:** The Kosmo pumps utilize analogue dosing to measure the volume ratio of flocculant to slurry, ensuring consistent mixing and minimizing chemical waste.
- **Chemical Compatibility:** With PTFE diaphragms and PVC/PVDF pump heads, these pumps are highly compatible with various chemicals, making them ideal for flocculant dosing.
- **Zero Leakage Design:** The intelligent design of the pump's ball valves prevents leakage and allows for easy disassembly for cleaning, reducing downtime and maintenance costs.

Features of Kosmo Mechanical Diaphragm Pumps

- **Variable-Frequency Motors:** Optional motors can enhance dosing stability.
- **Back Pressure Valve:** Ensures consistent dosing even with fluctuating water pressure.
- **Durability:** Designed for long-term use in harsh environments.

• Solution II: Air-Operated Double Diaphragm (AODD) Pumps

The second solution involved the use of Duotek AODD pumps, known for their flexibility and reliability in handling difficult liquids. Key benefits include:

- **Versatility:** Duotek pumps can handle a wide range of liquids, from corrosive acids to viscous paints and food products.
- **Variable Flow Control:** Easy adjustments to flow rates and head pressures without complex controls.
- **Self-Priming Capability:** Effective in suction lift applications, capable of dry running without damage.

Performance and Reliability of Duotek AODD Pumps

- **100% Wet Testing:** Each pump is tested for priming, sealing, and deadheading after assembly.
- **All-Plastic Air System:** Corrosion-resistant and suitable for harsh environments.
- **Customizable Options:** Available in various sizes and materials to meet specific application needs.

Positive Outcomes and Benefits

The implementation of these innovative dosing solutions led to significant improvements in the sludge filter press's performance. The operator experienced:

- **Increased Treatment Efficiency:** Enhanced dosing precision resulted in more effective sludge treatment.
- **Reduced Sludge Discharge:** The optimized processes led to a noticeable decrease in sludge output.
- **Improved Environmental Responsibility:** By minimizing waste and ensuring compliance with treatment requirements, the manufacturer strengthened its commitment to sustainable practices.

Conclusion

The challenges faced by filter press manufacturers in sludge management are significant, but innovative dosing solutions can provide effective pathways to improvement. By adopting advanced technologies such as mechanical diaphragm pumps and AODD pumps, companies can enhance operational efficiency, reduce waste, and promote sustainability. The successful partnership between the filter press manufacturer and the water-treatment expert serves as a testament to the importance of collaboration and innovation in overcoming industry challenges. As the demand for efficient wastewater treatment continues to grow, embracing these solutions will be crucial for manufacturers aiming to thrive in a competitive landscape.

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WATER NEWS BRIEF

December| 2025

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Launching of the Water Partnership Forum 2025 in Riyadh Under the Patronage of the Minister of Environment, Water and Agriculture

Under the patronage of H.E. Eng. Abdulrahman Al-Fadley, the 2nd Water Partnership Forum commenced at Riyadh's Four Seasons Hotel. Organized by SWPC, this two-day event (Nov 2-3) aligns with Saudi Vision 2030, focusing on sustainability, resource efficiency, and water infrastructure development. With 50+ speakers, 15+ sessions, and 25+ exhibitors, the forum fosters global collaboration on water security, PPP models, desalination innovations, and GCC partnerships. Key topics include private-sector engagement, renewable energy integration, and financing solutions. The event aims to drive actionable strategies for regional water resilience and sustainability.

Ecolab Strengthens Integrated Cooling Program for Data Centers

Ecolab Inc., a global leader in sustainability, has introduced its Cooling as a Service (CaaS) program, a state of the art cooling solution designed to enhance efficiency in data centers and high performance computing servers. Leveraging 3D TRASAR™ Technology and advanced Coolant Distribution Units (CDUs), the program integrates intelligent cooling management from site to chip. With AI driven demand increasing data center needs, Ecolab's CaaS minimizes energy use and conserves water, addressing complex cooling challenges. Josh Magnuson, EVP & GM, emphasized the program's role in operational excellence and resource conservation.

Major Investment Continues Across Guildford Clean Water Network

Thames Water is finalizing a £46 million pipeline project in Guildford, part of a £90 million investment to secure future water supply. The initiative includes installing 9 kilometers of new piping, linking west to east Guildford, ensuring continuous water for Cranleigh and nearby areas. Major upgrades to Shalford Water Treatment Works (£35 million) aim to enhance recovery capabilities post-outages, set for completion by 2028. Additionally, 5 kilometers of Guildford Road pipes will be replaced to address frequent bursts. These efforts, part of Thames Water's £20 billion network upgrade (2025-2030), aim to boost resilience against extreme weather and population growth.

Kurita to Join in Cross-Industry Collaboration Regarding Japanese Module in Post-ISS

Kurita Water Industries Ltd. has joined Japan LEO Shachu's cross-industry collaboration to develop water recycling and distribution technologies for the post-ISS Japanese Module. With the ISS retiring in 2030, Japan LEO Shachu leads initiatives to establish a commercially driven Low Earth Orbit economic zone, leveraging Japan's technological strengths. Kurita will analyze water needs and technical requirements for the Japanese Module, building on its expertise in water treatment and collaboration with JAXA on space water recycling systems. The group aims to advance sustainable space water solutions while contributing to Earth's sustainability through space derived innovations.

A Made in France Plant-based Activated Carbon for Treating Micropollutants in Water: The Carb'eau Project

The Carb'eau project, led by Groupe BORDET, SUEZ, and CNRS, has been selected under the French government's INNOV'EAU initiative, which supports water sector innovation with €100 million in funding. Carb'eau develops plant based activated carbon made in France, reducing the environmental footprint of water treatment materials. It eliminates up to 99% of micropollutants in 4 hours and boasts a lower carbon footprint compared to traditional alternatives. By using PEFC-certified French wood, the project strengthens national industrial sovereignty and reduces dependence on imports, aligning with France's sustainability and public health goals.

Momentum Builds for Subsea Desalination Technology

The XPRIZE Water Scarcity challenge highlights the urgency of addressing water scarcity, with Flocean's recent advancements in subsea desalination offering promising solutions. Their partnership with a Norwegian municipality and successful Series A funding expansion underscore the industry's momentum. However, the global water crisis is intensifying, with 57% of natural aquifers past critical tipping points, and freshwater demand already 1.7x greater than supply. Rising temperatures, shifting rainfall patterns, and increasing industrial and urban demands exacerbate the issue. Innovative solutions like desalination and water management are crucial to bridging the supply demand gap and mitigating this impending crisis.

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EGYPTIAN ENGINEERING COMPANY

Egyptian Engineering Company (EEC) Comprehensive Company Profile

The Egyptian Engineering Company (EEC) was established as the manufacturing arm of AEO, and over the years, it has evolved into one of the leading engineering, fabrication, and industrial manufacturing companies in Egypt and the wider Middle East. Since its inception, EEC has pursued a clear objective to set new standards in quality, reliability, and innovation within the engineering and industrial fabrication sectors.

Following its separation from AEO, EEC expanded its operations to serve both local and international clients, gaining extensive experience across multiple industries such as energy, infrastructure, and environmental engineering. Today, EEC is accredited by top regional and international authorities, with operational branches and business activities extending to the Kingdom of Saudi Arabia (KSA) and the United Arab Emirates (UAE). Its manufacturing facility in Egypt is among the most advanced in the region, equipped with high-capacity machinery and a skilled workforce that ensures precision and quality in every project.

EEC's mission is to continuously advance the level of fabrication and manufacturing in the region by integrating advanced technologies, applying rigorous quality control systems, and promoting sustainability and efficiency across all stages of production. The company envisions transforming Egypt and the Gulf region into a global hub for specialized industrial manufacturing through innovation, professional integrity, and continuous improvement.

Company Activities

EEC provides a comprehensive suite of engineering and manufacturing services designed to meet the demands of complex industrial projects. The company's activities span across four primary sectors:

- **Energy Sector:** EEC designs, fabricates, and delivers high-performance equipment for water hammering, oil & gas, and petrochemical industries. Its product range includes pressure vessels, separators, heat exchangers, petrochemical reactors, and storage tanks. The company's expertise in ASME-certified fabrication ensures compliance with the most stringent international standards.
- **Infrastructure Sector:** EEC plays a vital role in developing infrastructure across Egypt, KSA, and the UAE. It provides water hammer protection systems, surge vessels, and steel welded pipelines that are critical to the stability and performance of major municipal and industrial water systems. EEC's solutions are engineered to withstand high pressure and ensure operational reliability over decades.
- **Environmental Engineering:** EEC contributes significantly to environmental sustainability through the design and production of advanced water and wastewater treatment systems. Its portfolio includes multimedia filters, activated carbon filters, membrane bioreactors (MBR), moving bed biofilm reactors (MBBR), and river water purification plants, all aimed at promoting safe water reuse and environmental protection.
- **Fabrication and Industrial Solutions:** The company offers heavy steel fabrication services using advanced machinery, including dishing, rolling, and welding systems. EEC produces hemispherical, ellipsoidal, conical, and flat dish heads, in addition to modular steel containerized units used in power plants, oil facilities, and industrial applications.

Each of these activities is supported by EEC's state-of-the-art workshop, a highly trained technical team, and a project management framework that emphasizes safety, efficiency, and sustainability. EEC's quality management systems are compliant with international standards, ensuring consistent delivery that meets or exceeds client expectations.

Key Projects

EEC's track record reflects a legacy of successful project execution and long-term partnerships with leading industrial, governmental, and private entities. The company has completed over 2,000 major projects and fabricated more than 3,200 vessels and components for regional and international clients. A few highlighted projects include:

- **Chemical Reactor – Egypt (2023):** Fabrication of a 22 m^3 trans-alkylation reactor for ELAB in partnership with PETROMAINT and Triple-P. The project demonstrated EEC's capability in

high-pressure vessel manufacturing and its ability to meet demanding oil and gas specifications.

• **Jabal Hafeet Pumping Station – UAE (2022):** Supplied six heavy-duty surge vessels with design pressure of 150 bar and test pressure up to 230 bar for TRANSCO and HYDROPOWER. This project showcased EEC's precision engineering and adherence to international quality standards.

• **Sewage Treatment Plant – KSA (2021):** Manufactured 42 MBBR units with treatment capacities between 100 to 300 m^3/day for the National Water Company (NWC). The project contributed to improving wastewater management infrastructure in Saudi Arabia.

• **Pipeline and PS Package – UAE (2022):** Fabrication and delivery of 12 surge vessels with various capacities for TECTON Engineering & Construction, supporting large-scale infrastructure networks.

• **CPI Separator – Egypt (2024):** Designed and fabricated a U-stamped CPI separator for AGIBA Petroleum in partnership with EMC and Envirotech LLC, reinforcing EEC's position in the oil and gas sector.

Beyond these projects, EEC continues to execute multiple contracts across the Middle East, delivering complex systems for industrial water treatment, petrochemical facilities, and energy production. Its commitment to precision, safety, and on-time delivery has earned it the trust of international clients and partners.

Company Products

EEC's product line reflects its technical expertise and commitment to delivering safe, durable, and efficient industrial solutions. The following summarizes the main categories of its manufactured products:

• **Infrastructure Solutions:** EEC designs and fabricates advanced water hammer protection systems, including bladder-type, compressed-air, and hybrid surge vessels. It also supplies steel welded pipelines that ensure secure transportation of fluids under high-pressure conditions.

• **Water and Wastewater Treatment Equipment:** Including multimedia filters, activated carbon filters, membrane bioreactors (MBR), moving bed biofilm reactors (MBBR), and sequential batch reactors (SBR).

These systems are essential for purifying and recycling water for domestic, industrial, and environmental applications.

• **Fabrication and Pressure Vessels:** The company manufactures all types of pressure vessel heads, hemispherical, ellipsoidal, torispherical, conical, and flat, as well as modular containerized units used in industrial sites. Each unit undergoes rigorous testing and inspection in compliance with ASME Section VIII standards.

• **Oil, Gas, and Energy Equipment:** EEC provides complete systems such as phase separators, knockout drums, heat exchangers, reactors, heater treaters, dehydration columns, fractionation columns, storage tanks, metering tanks, bulk LPG tanks, LNG tanks, and air receivers. Each piece of equipment is engineered to withstand high pressure and temperature while maintaining efficiency and safety.

• **Additional Services:** EEC is also an R Stamp holder, authorized to perform repair services on pressure vessels according to ASME Code Section VIII. The company performs both heat treatment for dished heads (up to 650°C) and post-welding heat treatment cycles to ensure metallurgical integrity and long service life of its fabricated products.

EEC's integrated approach, covering design, production, testing, and after-sales support, ensures that every product fulfills the client's operational and technical requirements while adhering to international safety and quality benchmarks.

Key Images

Infrastructure Sector

10 surge vessels with capacities 100 m^3, 60 m^3 and 30 m^3.

70 m³ Hemispherical Surge Vessel

Surge vessels with design pressure 150 bar

Environmental Sector

Sewage Treatment Plant – MBBR Solution

Multimedia Sand Filters

Activated Carbon Filters

Iron and Manganese Removal Plants

Energy Sector

Chemical Reactor

Gauge Tanks

Phase Separator

LNG Tanks

Petrochemical Reactor

KnockOut Drums

Heater Treater

Fabrication Sector

Hemispherical Dish Head

Conical Dish Head

Ellipsoidal Dish Head

Flat Dish Head

Conclusion

EEC stands today as a benchmark of engineering excellence in Egypt and the Middle East. With its growing portfolio, international certifications, and multidisciplinary expertise, the company continues to contribute to the region's industrial and economic growth. Guided by its values of quality, integrity, and innovation, EEC remains focused on building a sustainable future through engineering solutions that exceed expectations and strengthen client partnerships.

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EEC welcomes partnership inquiries, project collaborations, and investment opportunities from both the private and public sectors. With a client-centered approach and a strong presence in the region, the company remains committed to fostering long-term business relationships built on mutual trust and excellence.

El-Nasr Castings Company: The National Fortress Guarding Egypt's Industrial Future

El-Nasr Castings Company was established in the mid-20th century to become one of the main pillars of heavy industries in Egypt. It has played a pivotal role in meeting the needs of both the local and international markets for many years. It is considered one of Egypt's leading industrial fortresses, thanks to its long history and extensive experience in producing ductile and grey cast iron castings.

El-Nasr Castings Company owns four factories — three located in Tannash, Giza, Egypt and the fourth in Om Zghio, Amreya, Alexandria, Egypt — dedicated to the production of high-quality castings.

Historical Background:

• In 1961 the company was established and included two plants for gray cast iron and alloyed steel.

• In1985 the company started the construction of ductile iron pipes plant which was opened in 1988.

• In1991 high quality castings plant was constructed to produce ductile iron valves.

• In2006 flour milling roll plant was established and the production has been started.

• In2008 the company started to producing Fe Si Mg 10 % and Fe Si Mg 5 % alloy.

Company Products:

- **Ductile iron pipes:** which serve as a backbone for water, wastewater, and infrastructure projects.

• **Size range:** from DN 100 to DN 1000 mm.

• **Capacity:** Up to 47000 ton/year.

• **Production method:** Centrifugal castings.

• **Conforming standards:** ISO 2531, EN 598, and EN 545

- **Ductile iron fittings and accessories.**
- **Size range:** Up to 2200 mm.
- **Capacity:** Up to 3200 ton/ year.
- **Production method:** Sand casting

- **Gate valves and butterfly valves:** available in different diameters.
- **Mill rolls:** used in wheat milling for flour production.
- **Bollard:** which used in seaports, available in different loads and size

- **Alloyed ductile iron rolls:** used in steel rolling.
- **Ferro-Silicon-Magnesium alloy:** the essential material for converting grey iron to ductile iron.
- **Decorative light poles:** in different figures and size.
- **Brake shoe:** for railway train.
- **In addition to** many products manufactured according to customer specifications.

All products undergo precise testing to ensure the highest levels of quality and durability.

Global Presence:

El-Nasr Castings Co. had already exported its products to more than 20 countries around the world, such as Spain, Italy, Germany, Cyprus, Algeria, Morocco, Libya, and etc. We are now seeking to resume exports once again to some Arab, African, and Middle Eastern countries, so that the company's name can regain its former presence in both internal and external markets.

Participation in National Projects

We have contributed to building infrastructure in many major national projects, including but not limited to:

- The New Administrative Capital.
- Hayah Karima project.
- New Mansoura city.
- Galala city.
- New Delta city.

The New Administrative Capital

New Galala City

Our Major Clients:

- Holding company for water and wastewater.
- Greater Cairo Water Company.
- Alexandria Water Company.
- Alexandria Construction Company.
- The construction Authority for potable water and wastewater.
- New Administrative Capital Company.

A New Chapter in the Company's History:

After a period of inactivity, the company has returned to life again — with full support from the Egyptian government and strong dedication from its loyal workforce. Over the past year, since operations resumed, the company has undergone a comprehensive development plan to achieve superior quality and higher productivity.

Key development achievements include:

- Continuous maintenance to improve equipment efficiency
- Upgrading several production lines
- Enhancing workforce skills through continuous training
- Expanding the customer base inside and outside Egypt through effective marketing
- Participation in many international exhibitions
- Participation in scientific conferences

What Makes El-Nasr Castings Company Unique:

- A fully integrated industrial capability — from design to final product.
- Over 70 years of historical expertise, earning the trust of Egyptian and Arab markets.
- Outstanding quality comparable to imported products, enabling participation in major national projects.
- Production of pipe diameters not available in any other company, such as 1000 mm, 900 mm, and intermediate diameters 250 mm, 350 mm, 450 mm.
- The production according to international standardization ISO 2531, and EN 545, EN 598.

Achievements in the Current Phase

• Providing several previously imported products, helping save foreign currency, such as mill rolls, alloyed ductile iron rolls, and Ferro-Silicon-Magnesium alloy.
• Sales have increased nearly fifteen-times compared to previous years.
• Upgrading most production lines and maintaining all equipment with frequent malfunctions.
• Establishing El-Nasr Apprenticeship station, a new educational institution in the area that connects theoretical education with practical training in the company's factories and laboratories , aiming to graduate highly skilled technicians capable of keeping pace with modern technological developments and supporting various industrial sectors.

Future Vision:

In the coming phase, the company will witness further expansion and modernization through new production lines capable of manufacturing ductile iron pipes up to 1800 mm in diameter. The focus will remain on applying international quality standards, expanding the production of non-standard items to deepen local manufacturing, reduce import costs, enhance competitiveness of Egyptian products, and open new export markets.

Finally:

El- Nasr Castings Company will remain a great and honorable model of national industry, combining expertise and quality, and supporting the state's vision of building a strong industry based on local production, industrial progress, and sustainable development.

Chairman of Board and Managing Director
Mr. Hamdy Abd-Elaziz Gewely

Appreciation and Gratitude:

All employees of El-Nasr Castings Company extend their sincere gratitude and deep appreciation to **Mr. President Abdel Fattah El-Si-si, President of Arab Republic of Egypt,** and **Lieutenant General Kamel Al-Wazir, Deputy Prime Minister for Industrial Development and Minister of Industry and Transport** for their great support in restarting the company and giving it a significant opportunity to relaunch once again. Their support has strengthened the company's production capabilities, enhanced its efficiency, restored full operational capacity as before, and uplifted the morale of the employees, renewing their hope for a better future. This has enabled the company to regain its former status as a pioneer in industrial development in Egypt and the Middle East.

Employees also extend their thanks to Mr. Hamdy Abdel Aziz Aly Gewely, Chairman of Board and Managing Director, for his efforts in managing the company in all company factories located in Giza and Alexandria. His ambitious plan ensured the optimal use of available resources, the effective utilization of previously untapped potential, and the adoption of innovative methods never before applied in marketing, sales, production, and maintenance. He also developed strategic plans to face external market challenges. Moreover, he revived the spirit of dedication and teamwork among employees, turning them into vital gears that drive the wheel of production.

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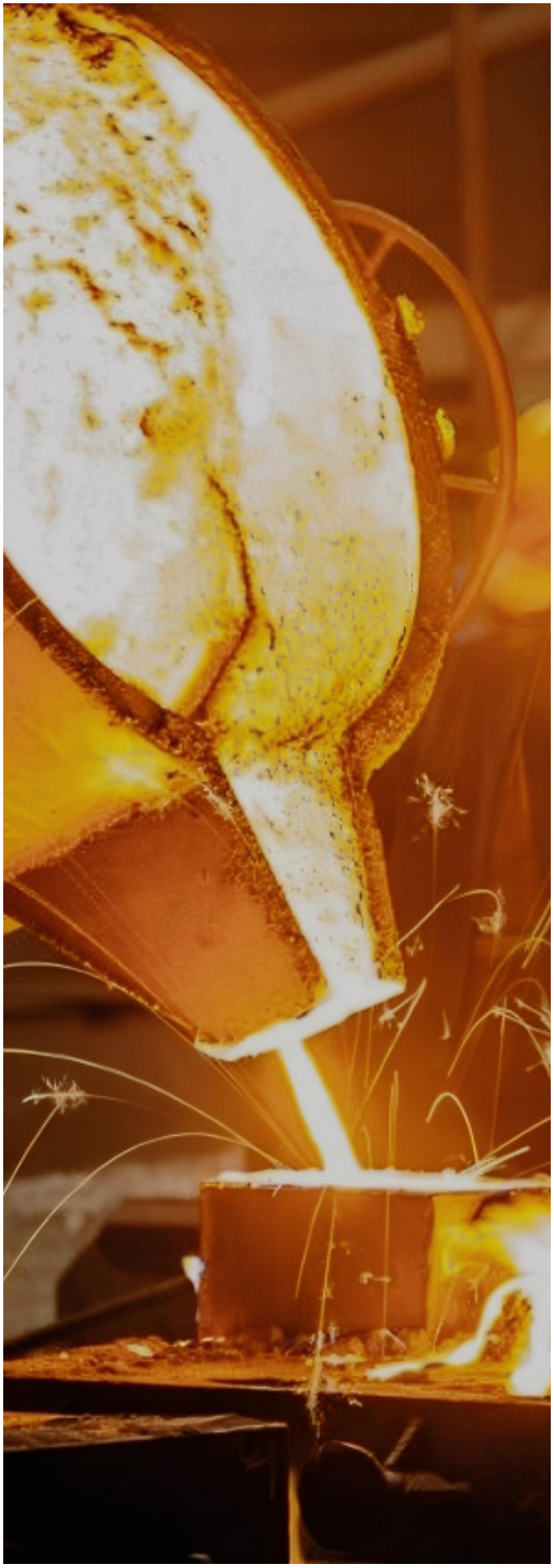


Water Technology: Pioneering Local Solutions for Chlorine Injection and Water Quality

Water Technology was established for the purpose of supplying water companies due to the experience of its founders in this field for the past 25 years. The company was approved as an exclusive official agent for the American company Enchlor for chlorine injection supplies and equipment. The company has also been approved as an authorized distributor for the American company Archer for chlorine injection supplies and equipment.

After concluding many successful deals with the companies of the Holding Company for Drinking Water and Wastewater in the field of supplies in order to localize the local industry, the right to local manufacture was taken from the American Enchlor Company (FRANCHIES) accredited by the American Chamber of Commerce and documented by the Egyptian Embassy in the United States of America in order to manufacture all the company's products as (chlorine vacuum regulator - wall or cabinet flow meter - chlorine injector - automatic changeover , chlorine gas alarm device - etc.) On Egyptian lands, with Egyptian hands, with international quality.

The Egyptian manufactured devices were tested by the American company inside the factory in America and reported high quality. The Egyptian manufactured devices were tested by the Faculty of Engineering, Ain Shams University, and reported their high quality.

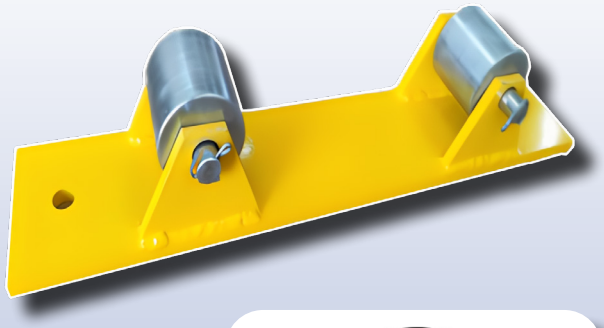
The Egyptian manufactured devices were also tested and approved by the Holding Company for Potable Water and Sanitation and reported their quality and recommended Trading within the company's branches.In the company's pursuit of quality and always the best, the company obtained the ISO 9001:2015 certificate.

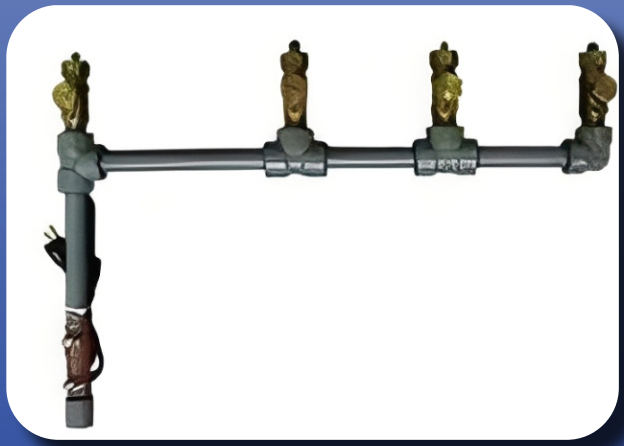
Several successful deals were made with government water companies, and the quality of the equipment was confirmed even after the warranty year had expired.

We are also proud to have a specialized team for technical support, installation and maintenance with all spare parts available.

Products manufactured and sold by the water technology company :

- Vacuum Regulator with different and multiple capacities from 2-150 kg/h .
- Chlorine flowmeter with different and multiple capacities from 2-150 kg/h.
- Chlorine Floor Cabinets with different and multiple capacities from 10-150 kg/h.
- Chlorine Ejector with different and multiple capacities from 2-150 kg/h.
- Chlorine Pressure Switchover devices .
- Chlorine Pressure Reducer.
- Chlorine Gas Leak Detector





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Enhancing Energy Efficiency in Wastewater Treatment: The Role of Variable Frequency Drives

Reducing power consumption and increasing energy efficiency are critical goals for industries worldwide, particularly in the wastewater sector where energy costs often represent the highest single operating expense. A key focus in this area is optimizing energy efficiency in treatment processes, especially in the context of creating net-zero energy wastewater treatment facilities. One effective technology for achieving this is the Variable Frequency Drive (VFD), which can maximize energy efficiency in hydraulic mixing systems without compromising performance. This article explores the benefits of using VFDs to optimize energy consumption in hydraulic mixing systems for anaerobic digesters.

Understanding Anaerobic Digesters and Cogeneration

Anaerobic digesters are a common feature in larger wastewater treatment facilities. While they may not be the most energy-intensive processes, the biogas produced can significantly offset energy needs in other facility operations. This is accomplished by utilizing biogas to fuel boilers or through cogeneration systems. In advanced facilities, the energy generated from cogeneration can be substantial enough to cover the entire power requirements of the facility.

Maximizing Biogas Production

To maximize energy output from anaerobic digesters, it is essential to optimize biogas production while minimizing the energy required for the digestion process. The most prevalent design for anaerobic digestion is the continuously stirred tank reactor (CSTR), which relies on continuous mixing to maintain a homogeneous process volume. This uniformity is crucial for consistent temperature and pH levels, dilution of inhibitory compounds, and enhanced biological contact. Effective mixing also prevents the settling of suspended solids, which can reduce digester volume and lead to costly maintenance.

The Role of Hydraulic Mixing Systems

Hydraulic mixing systems are typically employed to ensure effective mixing in CSTR anaerobic digesters. These systems consist of multiple nozzle assemblies within a tank, with flow often driven by a chopper pump. This configuration allows for efficient and even distribution of mixing energy throughout the entire volume, while keeping moving parts accessible for maintenance outside the digester.

• Controlling Mixing Energy with Variable Frequency Drives

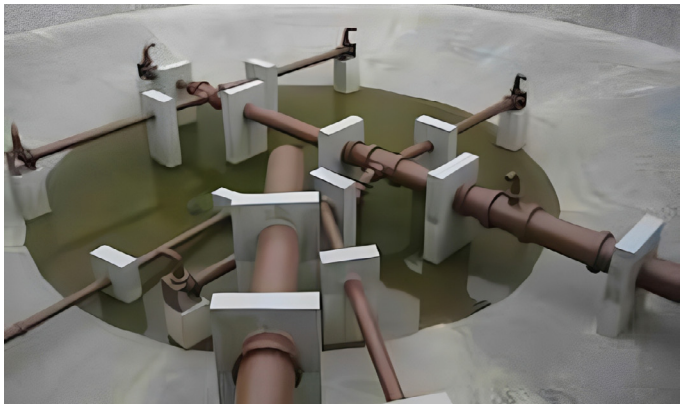
The hydraulic mixing system centered around a chopper pump designed for a typical 1 million gallon (MG) digester. As the flow to the nozzles is adjusted, the energy transferred to the fluid also varies. By manipulating the operating curve of the chopper pump with a VFD, operators can control the mixing energy applied in their processes.

• Balancing Mixing Energy and Digester Performance

The relationship between mixing energy and digester performance is crucial. As mixing energy increases, performance improves due to better consistency in temperature and pH, along with dilution of inhibitory substances. However, there is a threshold beyond which additional energy does not enhance performance and may even lead to inefficiencies, such as mechanical foaming and sludge bulking. Typically, a mixing energy range of 0.15 to 0.35 horsepower (hp) per 1,000 cubic feet (CuFt) yields optimal volatile solids reduction per unit of mixing energy.

• Energy Requirements for Mixing

The energy required to prevent deposition in the digester is generally higher than that needed for maintaining a homogeneous process volume. However, it is rarely necessary to sustain the maximum energy continuously. In the case of our hydraulic mixing system, some applications may only require full mixing energy for a couple of hours daily to resuspend settled solids. The remainder of the time, lower mixing energy can be maintained, resulting in significant energy savings.



Operational Savings with VFD Implementation

For a 1 MG digester mixing system, operating at full speed (60 hertz or Hz) consumes 46.8 hp, serving as the baseline energy consumption. By using a VFD to operate at 45 Hz, the system reduces its energy consumption to 19.8 hp. Assuming a daily schedule of two hours at 60 Hz and the rest at 45 Hz, the average operating power drops to 22.1 hp an impressive reduction of nearly 53%. With power costs estimated at $0.08 per kilowatt (kW), this results in annual operational savings of approximately $12,982, all without sacrificing system performance.

• Expanding VFD Applications in Wastewater Treatment

Beyond anaerobic digesters, VFDs can enhance efficiency in any hydraulic mixing system with variable mixing energy needs. This includes batch tanks with fluctuating fluid levels or equalization tanks. As VFD technology becomes more prevalent and cost-effective, an increasing number of applications stand to benefit from improved control and efficiency in process mixing.

• The Economic Advantage of Variable Frequency Drives

For wastewater treatment plants focused on cost-efficiency, implementing a VFD allows for significant energy savings without compromising mixing power. By adopting this technology, facilities can reduce energy costs by 50% or more while ensuring effective mixing in digesters and other tanks. Ultimately, variable mixing facilitated by VFDs leads to consistent operational savings, contributing to the overall goal of energy-efficient wastewater treatment. As the industry continues to prioritize sustainability and cost reduction, the integration of VFDs represents a strategic move towards achieving these objectives, making wastewater treatment facilities not only more efficient but also more environmentally friendly.

Conclusion

The implementation of Variable Frequency Drives (VFDs) in wastewater treatment facilities represents a transformative approach to energy management. By optimizing mixing processes in anaerobic digesters and other hydraulic systems, VFDs not only enhance operational efficiency but also contribute significantly to cost savings and sustainability goals. As the demand for energy-efficient solutions grows, the adoption of VFD technology will be crucial for wastewater treatment plants aiming to reduce their environmental footprint while maintaining high performance. Embracing this technology not only benefits facility operations but also aligns with broader initiatives toward sustainable practices in the industry.

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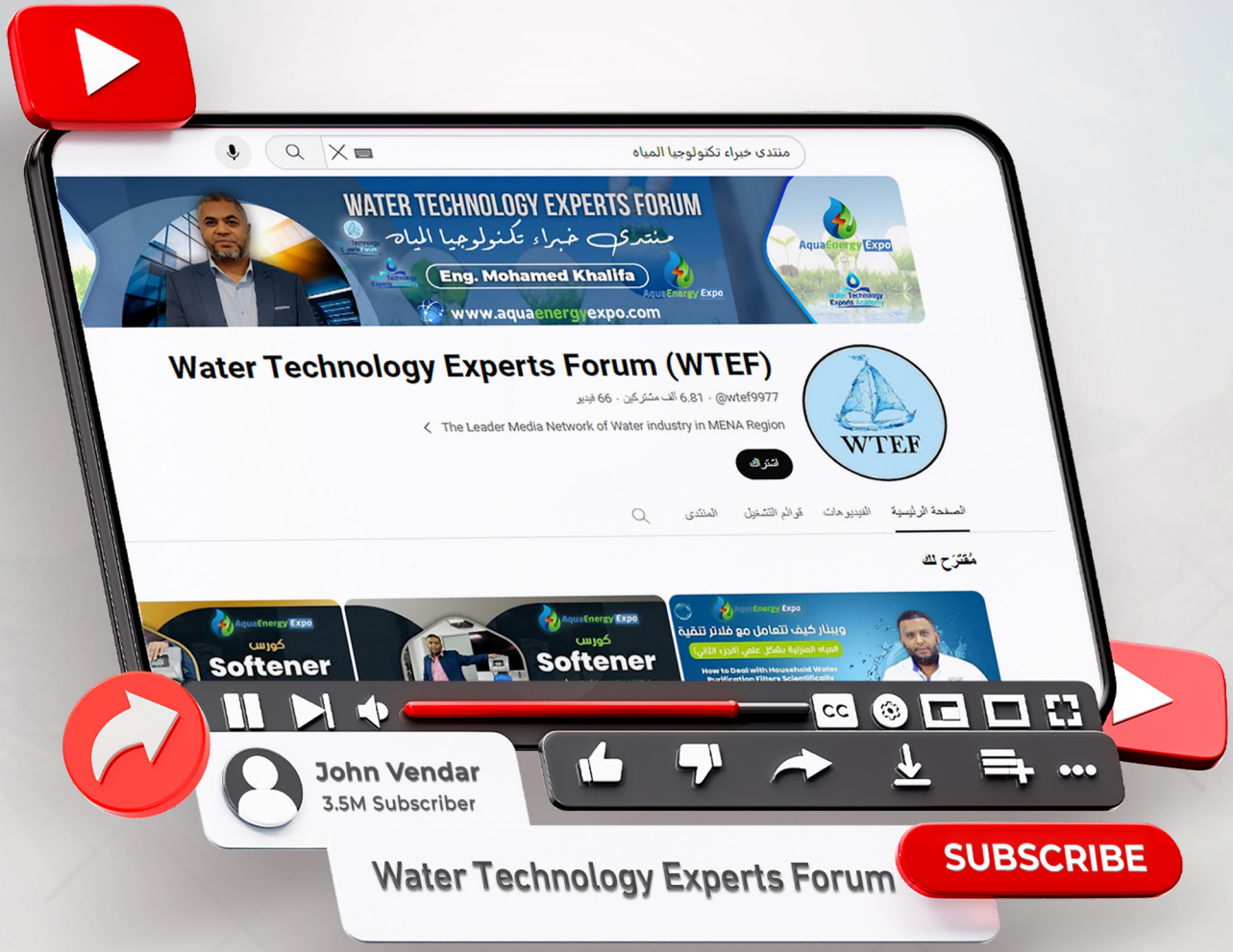

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Friday, December 5th

8:00-10:00 Pm (Saudi Arabia Time)

Dr. Wael Abd El-Moez.

"The Next-Generation Revolution in Wastewater Treatment with Higher Efficiency, Less Space, and Lower Energy Consumption"

Saturday, December 6th

8:00 to 10:00 PM (Saudi Arabia Time)

Dr. Hossam Mostafa

Global Challenges in Water Purification, Desalination, and Wastewater Treatment: Towards Sustainable Solutions.

Saturday, December 13th

8:00-10:00Pm (Saudi Arabia Time)

Dr. Khaled Elsefey

"RO Water Treatment and Desalination Plant Design"

Friday, December 19th

8:00 to 10:00 PM (Saudi Arabia Time)

Dr. Safi Dif

"The Importance of Digital Modeling in Understanding Wastewater Treatment"

Saturday, December 20th

08:00 to 10:00 PM (Saudi Arabia Time)

Dr. Ahmed Saad

"Different Techniques for Detecting Protozoa in Drinking Water and Assessing Their Risks"

Friday, December 26th

08:00 to 10:00 PM (Saudi Arabia Time)

Dr. Salah Ghorab

Energy Planning and Management"

Saturday, December 27th

08:00 to 10:00 PM (Saudi Arabia Time)

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Turning Crisis into Resilience: Accessing Water through Solar Energy for Vulnerable Communities

The global water crisis poses significant challenges to millions of people, particularly in vulnerable communities where access to clean water is limited. As climate change exacerbates water scarcity and increases the frequency of droughts, innovative solutions are urgently needed. Solar energy emerges as a promising alternative, providing a sustainable method for pumping and distributing water. This article explores the intersection of solar energy and water access, highlighting successful case studies that demonstrate the transformative potential of this approach in enhancing community resilience.

The Significance of Water and Solar Energy

Water is vital for life, agriculture, and economic growth. However, many communities, particularly in arid and semi-arid areas, struggle with significant water shortages. At the same time, solar energy has emerged as a renewable and sustainable energy source that can be effectively utilized for various applications, including water pumping. By harnessing solar energy, communities can decrease their dependence on fossil fuels, lower operational costs, and enhance water accessibility.

Challenges Faced by Vulnerable Communities

Vulnerable communities encounter several challenges in accessing water:

- **Water Scarcity:** Insufficient rainfall in many regions leads to dwindling groundwater supplies. The United Nations warns that by 2025, two-thirds of the global population could experience water-stressed conditions.
- **Weak Infrastructure:** Many developing nations suffer from outdated or nonexistent water supply infrastructure, which hinders efficient water delivery to those in need.
- **High Costs:** Traditional water extraction and distribution methods, such as diesel-powered pumps, can be prohibitively expensive, especially for low-income families.

Benefits of Using Solar Energy for Water Supply

Utilizing solar energy for water supply presents several advantages:

- **Sustainability:** Solar energy is a renewable resource that can be harnessed in virtually any location with sufficient sunlight. This characteristic makes it particularly suitable for remote areas where conventional power sources are unavailable.

• **Cost-Effectiveness:** Once installed, solar water pumping systems have low operating and maintenance costs. This financial benefit is crucial for communities with limited budgets.
• **Increased Water Access:** Solar-powered systems can be deployed in rural and underserved areas, significantly improving access to clean water.
Technologies Used in Solar Water Pumping
Various technologies are employed in solar water pumping systems:
- Solar Water Pumps: These systems convert sunlight into electricity to operate submersible or surface pumps. They can draw water from wells, rivers, or lakes.
- Photovoltaic (PV) Panels: PV panels are the heart of solar water pumping systems, capturing sunlight and converting it into electrical energy.
- Storage Solutions: Water storage tanks are often integrated into solar pumping systems to ensure a reliable supply of water, especially during periods of low sunlight.

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Successful Case Studies

Case Study 1: Solar Water Pumping in India

In India, the state of Rajasthan faces severe water scarcity, exacerbated by erratic rainfall and high temperatures. The Solar Water Pumping Program, launched by the Indian government, aims to provide farmers with access to water for irrigation through solar-powered pumps.
• **Implementation:** The program involves installing solar pumps in remote villages, enabling farmers to irrigate their crops without relying on expensive diesel fuel. The initiative includes training local technicians to maintain the systems, ensuring long-term sustainability.
• **Impact:** The program has led to a significant increase in agricultural productivity, with farmers reporting yields that are 30-50% higher than before. Additionally, the financial burden of fuel costs has been alleviated, allowing farmers to invest more in their livelihoods.

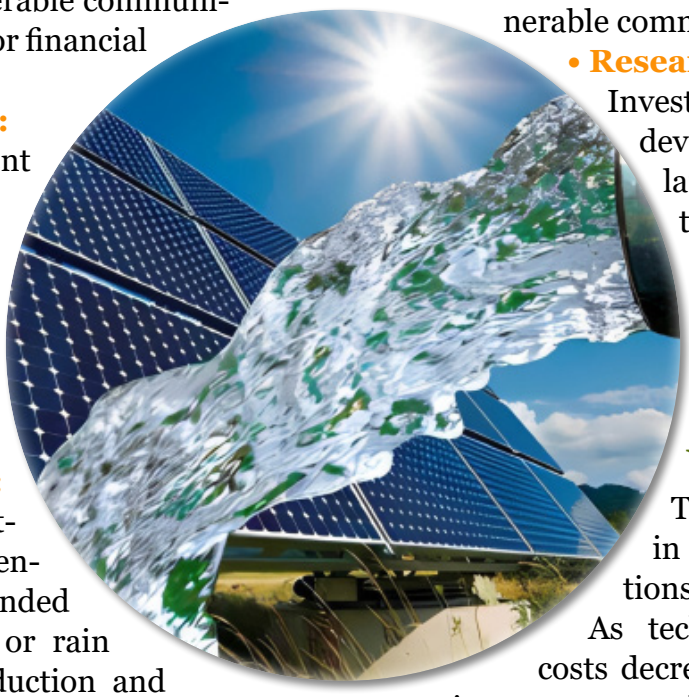
Case Study 2: Solar Water Solutions in Sub-Saharan Africa

In Sub-Saharan Africa, many communities lack access to clean drinking water. The Solar Water Pumping Project implemented by the United Nations Development Programme (UNDP) in Malawi demonstrates the potential of solar energy to address this issue.
• **Implementation:** The project involved installing solar-powered water pumps in rural areas, providing communities with access to clean water sources. The initiative also included community training programs to educate residents about system maintenance and water management.
• **Impact:** The project has successfully improved water access for over 10,000 people in Malawi. Health indicators have improved, with a reported decrease in waterborne diseases. Furthermore, the availability of clean water has empowered women and children, who traditionally bear the burden of water collection, allowing them to engage in education and economic activities.

Challenges in Implementing Solar Energy Projects

Despite the numerous benefits, the implementation of solar energy projects for water supply faces several challenges:

- **Financing:** Securing funding for initial investments in solar technology can be a significant barrier. Many vulnerable communities lack access to credit or financial resources.
- **Technical Expertise:** The successful deployment of solar water pumping systems requires skilled technicians for installation and maintenance. In many regions, there is a shortage of trained personnel.
- **Climate Variability:** Changes in weather patterns can affect the efficiency of solar systems. Extended periods of cloud cover or rain can reduce energy production and impact water supply.



Strategies to Enhance Solar Energy Use for Water Supply.

To overcome these challenges and enhance the use of solar energy for water supply, several strategies can be implemented:

- **Public-Private Partnerships:** Collaborations between governments, NGOs, and private sector companies can facilitate funding and technical support for solar projects.
- **Community Engagement:** Involving local communities in the planning and implementation of solar projects ensures that solutions are tailored to their specific needs and circumstances.
- **Training Programs:** Establishing training programs for local technicians can build the necessary skills for installation and maintenance of solar systems, ensuring long-term sustainability.

The Role of Governments and International Organizations

Governments and international organizations play a critical role in supporting solar energy initiatives for water supply:

- **Policy Development:** Governments can create supportive policies that encourage investment in renewable energy and provide incentives for solar water pumping projects.
- **Financial Support:** International organizations, such as the World Bank and UNDP, can provide financial assistance and technical expertise to help implement solar projects in vulnerable communities.
- **Research and Innovation:** Investing in research and development of new solar technologies can lead to more efficient and cost-effective solutions for water supply.

The Future of Solar Energy in Water Supply

The future of solar energy in providing water solutions looks promising. As technology advances and costs decrease, solar water pumping systems are becoming more accessible to vulnerable communities. Innovations in energy storage, such as batteries, can further enhance the reliability of solar-powered water systems, ensuring a consistent supply even during periods of low sunlight.

Conclusion

Harnessing solar energy for water supply represents a sustainable and innovative solution to the water crisis facing vulnerable communities. By improving access to clean water, these initiatives not only enhance public health but also contribute to economic development and social empowerment. Through collaboration, investment, and community engagement, the potential of solar energy can be fully realized, transforming the lives of millions and building resilience against future challenges.

ZENI Company: Harnessing Microalgae for Sustainable Industrial Wastewater Treatment

Water scarcity and pollution are urgent global challenges exacerbated by industrial wastewater discharge, which introduces harmful nutrients into ecosystems. This leads to eutrophication, diminishing water quality and threatening aquatic life. In response, innovative solutions are emerging, with companies like ZENI at the forefront. Founded in 2023, ZENI harnesses microalgae to treat wastewater sustainably, offering a dual benefit: purifying water and producing valuable by-products.

This approach not only addresses environmental concerns but also supports a circular economy, making it a promising option for water-intensive industries.

The ZENI Solution: Microalgae as a Natural Filter

• Unique Approach to Wastewater Treatment

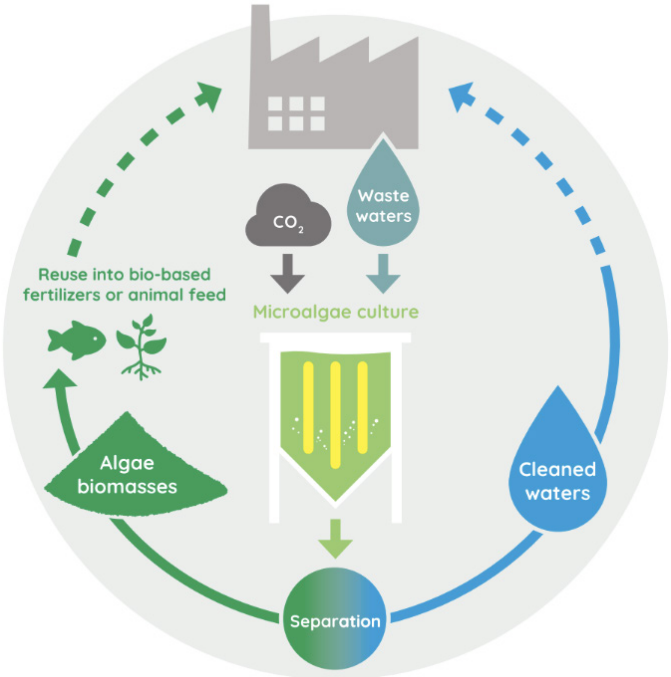
ZENI has quickly garnered attention for its unique approach to wastewater treatment, employing the natural capabilities of microalgae microscopic aquatic plants that thrive on nutrients in water. The company's technology is designed to not only clean wastewater but also to

generate valuable by-products that can contribute to a circular economy.

• The Photobioreactor: A Controlled Environment for Microalgae Growth

At the heart of ZENI's innovative solution is a photobioreactor, a sophisticated system that resembles a large, controlled aquarium installed at the outlet of a factory's wastewater system. This setup allows for the cultivation of carefully selected, non-toxic microalgae species under optimal conditions.

As industrial wastewater flows through the photobioreactor, the microalgae absorb excess nutrients such as nitrates and phosphates, effectively purifying the water in the process. The treated water can then be safely discharged into the environment or reused within the factory's operations, significantly reducing reliance on fresh water resources.



Addressing Water-Intensive Industries

• Promising Solutions for Key Sectors

ZENI's scalable and cost-efficient solution is particularly promising for water-intensive industries such as aquaculture, brewing, dairy production, and the broader food sector. These industries are increasingly seeking sustainable methods to manage wastewater and decrease their consumption of fresh water. By adopting ZENI's system, factories can enhance their environmental performance and operational resilience in the face of tightening water regulations and growing consumer demand for sustainable practices.

• Benefits of Microalgae-Based Treatment

One of the key advantages of ZENI's method is the generation of valuable by-products.

As microalgae consume nutrients from the wastewater, they multiply rapidly, creating a dense biomass. This biomass can be harvested and processed into bio-based fertilizers and protein-rich animal feed, adding significant value to the treatment process while supporting the principles of a circular economy.

Integrated systems like ZENI's, which transform waste into a resource, are crucial for achieving the European Union's climate and environmental targets. By converting wastewater into valuable products, ZENI not only addresses pollution but also contributes to sustainable agricultural practices.

Support and Growth: The Role of Green Assist

• Strategic Guidance for Scaling

ZENI's journey toward scaling its technology has been bolstered by crucial support from Green Assist, a European advisory initiative aimed at helping environmental projects reach their market potential. After connecting at the 2023 European Maritime Day in Brest, France, ZENI applied for support and was selected for tailored assistance.

From February to September 2024, ZENI worked closely with a Green Assist expert who provided guidance on market analysis in key industries, regulatory mapping, and business

model refinement. This collaboration has enabled ZENI to better understand its market opportunities and the regulatory landscape, strengthening its strategy for attracting investors and forming strategic partnerships.

• CEO Insights: Validation and Market Interest

Reflecting on the experience, Jean-Michel Pommet, CEO of ZENI, praised the collaboration with Green Assist. He noted that the support helped validate the industrial needs for their microalgae-based solution and generated promising market interest. This validation is essential for ZENI as it seeks to establish itself in the competitive landscape of wastewater treatment technologies.

The Future of ZENI and Microalgae Solutions

• Expanding Applications and Market Reach

As ZENI continues to develop its innovative technology, the potential for microalgae-based treatment systems to revolutionize industrial wastewater management becomes increasingly apparent. The company's commitment to sustainability aligns with global efforts to combat water scarcity and pollution, making it a vital player in the environmental sector.

Looking ahead, ZENI aims to expand its applications beyond its initial focus areas. The versatility of microalgae allows for potential integration into various industries, including pharmaceuticals, cosmetics, and bioenergy. By diversifying its market reach, ZENI can enhance its impact on environmental sustainability and contribute to a broader range of economic sectors.

• Collaborations and Partnerships

To further its mission, ZENI is actively seeking collaborations and partnerships with other organizations, research institutions, and industries. By leveraging collective expertise and resources, ZENI can accelerate the development and adoption of its microalgae-based solutions, ultimately contributing to a more sustainable future.

Conclusion

ZENI's microalgae-based wastewater treatment represents a significant advancement in sustainable industrial practices. By transforming waste into valuable resources, ZENI addresses critical environmental challenges while promoting a circular economy. As industries increasingly seek eco-friendly solutions, ZENI's innovative approach could pave the way for a more sustainable future, ensuring the preservation of vital water resources and supporting global efforts against pollution. With continued growth and collaboration, ZENI stands poised to make a lasting impact on wastewater management and environmental sustainability.

Fengning Pumped Storage Power Station: The Dawn of a New Era in Renewable Energy

China's Fengning Pumped Storage Power Station, often referred to as the "water battery," represents a significant advancement in renewable energy technology. This state-of-the-art facility is designed to ensure that electricity demands are consistently met, serving as a crucial backup for the power grid. By utilizing the principles of pumped storage, Fengning not only enhances energy reliability but also supports the integration of renewable energy sources like wind and solar power.

Pumped Storage: A Reliable Energy Solution

Pumped storage is an innovative method to balance electricity supply and demand. The process involves using surplus energy during low-demand periods to pump water uphill to an elevated reservoir. When electricity demand rises, the stored water is released back downhill through turbines, generating electricity to meet the increased demand.

This cyclical process allows for efficient energy storage and retrieval, making it an ideal solution for managing fluctuations in energy supply.

• The Capacity of Fengning

The Fengning Pumped Storage Power Station boasts an impressive capacity of 3.6 gigawatts (GW). Its true value lies in its ability to support intermittent renewable energy sources, acting as a battery that utilizes water and gravity instead of chemicals. The facility is equipped with advanced pumping turbines that can operate at variable speeds, allowing for real-time adjustments in flow based on demand.

The Journey of Fengning: From Concept to Completion

• Construction Timeline

Nestled in the mountains of Hebei Province, the Fengning facility began construction in June 2013. The project faced numerous challenges, but it was ultimately completed in phases.

The Gezhouba Group was awarded the main contract in April 2014, and the plant was constructed in two equal phases of 1,800 MW each. Each phase included six reversible pump-turbine units, each rated at 300 MW.

The final unit of the plant was activated in August 2024, marking the completion of this monumental project. The integration of variable-speed machines during the second phase significantly enhanced the plant's operational capabilities.

•Technological Innovations

In 2017, ANDRITZ Hydro was contracted to supply two variable-speed generators for the Fengning project. These generators have a nominal capacity of 330 MVA in generator mode and 345 MVA in pump mode, showcasing the advanced technology integrated into the station. The ability to adjust speeds dynamically allows Fengning to respond quickly to changes in electricity demand, making it a vital asset for stabilizing the grid.

The Functionality of Fengning: Meeting Energy Demands

• Annual Energy Production

Fengning is expected to produce approximately 6.61 terawatt-hours (TWh) of electricity annually, while consuming about 8.71 TWh for the pumping process. This balance highlights the intricate relationship between energy input and output in pumped-storage systems. The facility's design allows it to store enough energy to operate at full capacity for 10.8 hours, providing a reliable source of backup power when needed.

• Supporting Renewable Energy Projects

Strategically located near Zhangjiakou, a major renewable energy hub, Fengning plays a critical role in supporting local wind and solar projects. By capturing surplus electricity generated by these sources, the plant ensures that no clean energy goes to waste. This synergy between Fengning and nearby renewable energy installations enhances overall grid stability and efficiency.

Overcoming Challenges: Engineering Feats and Solutions

• Navigating Geographic Obstacles

The construction of the Fengning Pumped Storage Power Station presented numerous challenges, particularly due to its mountainous terrain. Engineers faced the task of creating extensive caverns and tunnels to house the facility's infrastructure. The planning and execution of these underground structures required years of meticulous work to ensure safety and stability.

• Integration with the Power Grid

Connecting Fengning to China’s extensive power grid involved the construction of four 500 kV transmission lines. This integration is essential for delivering the plant's generated electricity to the grid and ensuring that it can respond effectively to fluctuations in demand.

Seasonal rainfall also impacts water levels in the reservoirs, which further complicates the integration process. Nevertheless, the plant is already operational and connected to the grid, contributing to China's efforts to reduce emissions and reliance on coal.

Setting New Standards: Fengning's Global Impact

• A Benchmark in Hydropower

With its completion, the Fengning Pumped Storage Power Station has set a new global benchmark in the hydropower sector. It is now recognized as the largest pumped-storage facility in the world, surpassing the Bath County project in the United States. The facility's total installed capacity of 3.6 GW is a testament to China's commitment to advancing renewable energy infrastructure.

• Achievements and Records

Fengning has achieved four significant records in the realm of pumped storage:

1. Largest Installed Capacity: With a capacity of 3.6 GW, it holds the title of the largest pumped-storage hydropower plant globally.
2. Greatest Storage Capability: The facility's reservoirs provide substantial energy storage, enabling it to operate effectively during peak demand periods.
3. Largest Underground Facility: The complex features an extensive underground structure designed to withstand extreme conditions.
4. Most Extensive Cavern Network: Fengning boasts a record-breaking network of caverns accessed via 190 tunnels, showcasing advanced engineering capabilities.

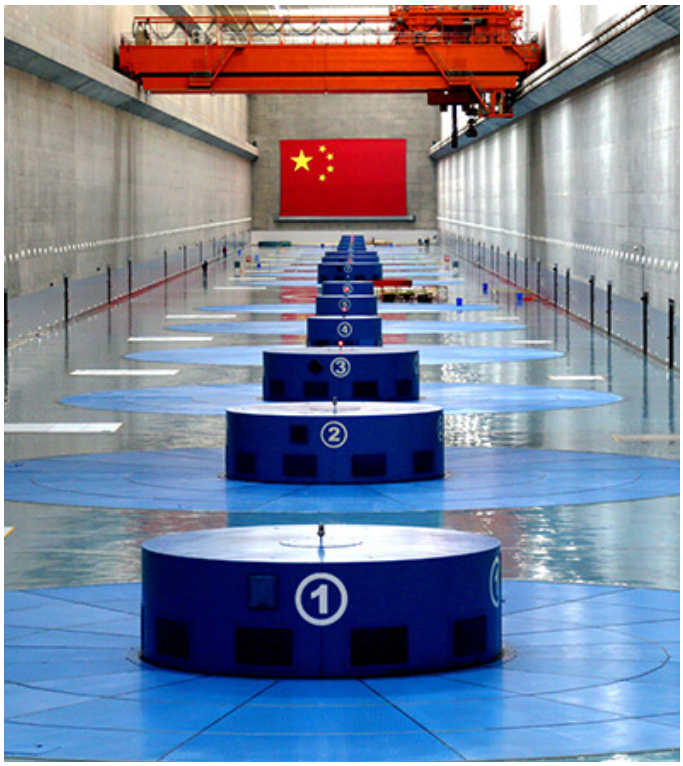
The Future of Pumped Storage in China

• Commitment to Renewable Energy

According to the World Hydropower Outlook 2024, China continues to lead the world in hydropower development. In 2023 alone, the country added 6.7 GW of new hydropower capacity, including over 6.2 GW of pumped-storage installations. With Fengning now operational, China aims to expand its pumped-storage capacity to 80 GW by 2027 and reach a total hydropower capacity of 120 GW by 2030.

• International Recognition and Collaboration

The International Hydropower Association (IHA) recognizes the importance of pumped storage in achieving net-zero emissions. To promote this message, the IHA launched a year-long campaign to drive pumped storage development, culminating in the International Forum for Pumped Storage Hydropower in Paris in 2025. This event will feature discussions on policy recommendations, key announcements, and opportunities for collaboration among global stakeholders.



Conclusion

The Fengning Pumped Storage Power Station stands as a symbol of China's leadership in renewable energy and large-scale infrastructure development. With an investment of $2.6 billion and over 11 years of construction, this facility not only meets the growing energy demands of northern China but also highlights the potential of pumped storage as a reliable energy solution. As the world increasingly turns to renewable energy sources, Fengning exemplifies how innovative technologies can be harnessed to create a sustainable future. By transforming water and gravity into a robust energy storage system, China is paving the way for a cleaner, greener energy landscape that can adapt to the challenges of climate change and energy transition.

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LONGi to Attend COP30 in Brazil, Discussing Building a Resilient Zero-Carbon World

LONGi, a global leader in solar technology, is actively participating in COP30 (Nov 10-21) in Belém, Brazil, with a focus on climate action, energy equity, and biodiversity conservation. The company will release its 2024-2025 Climate Action White Paper, unveil the 2025 Biodiversity Conservation Report, and showcase its "Protect the Amazon" Rainforest Conservation Project. Additionally, LONGi will host discussions on achieving a zero-carbon future through innovative technologies and partnerships. Li Zhenguo, LONGi's founder, emphasized the importance of energy system transformation and collaboration to accelerate the global zero carbon vision.

Iberdrola obtains final authorization for the NECEC transmission line between the United States and Canada

Avangrid, a subsidiary of Iberdrola, has secured the final permit for the New England Clean Energy Connect (NECEC), a 233-kilometer high voltage line linking the US and Canada. Set to operate by late 2025, the project will deliver 1,200 MW of hydroelectric power from Quebec to New England, reducing carbon emissions by 3.6 million metric tons annually. The NECEC has created 1,600+ jobs, enhanced grid reliability, and will provide clean energy to 1.2 million households, saving Massachusetts customers €2.6 billion. This initiative marks a transformative step toward a sustainable energy future.

First Solar Inaugurates New $1.1 Billion AI-Enabled Louisiana Manufacturing Facility

First Solar's new $1.1 billion manufacturing facility in Iberia Parish, Louisiana, opened ahead of schedule, creating over 700 jobs and aiming for 826 by year end. The facility, spanning 2.4 million square feet, will add 3.5 GW of annual solar capacity, boosting First Solar's U.S. production to 17.7 GW by 2027. It uses American materials and advanced AI technology, enhancing efficiency and quality. The project is expected to increase Iberia Parish's GDP by 4.4% and supports President Trump's energy dominance agenda, reinforcing U.S. reindustrialization and job creation in the solar industry.

Estelle Brachlianoff: "Veolia's Ambition is to be at the Forefront of a New Wave of Heating Networks across Europe."

Veolia unveiled its ambitious strategy to decarbonize district heating in Europe at the inauguration of its state of the-art multi-energy cogeneration plant in Poznań, Poland. The facility supplies 60% of heat to 560,000 residents, achieving 92% efficiency and reducing CO_2 emissions by 25%. Veolia aims to eliminate coal from its operations by 2030, leveraging its Ecothermal Grid solution combining renewable energy, waste heat recovery, and AI tools. The strategy targets €350M in revenue by 2030 while enhancing energy security and accessibility. Poznań's scalable model sets a blueprint for Veolia's 500+ networks across Europe.

Advocating for the Importance of Water with Global, Influential Mayors

Grundfos emphasized water's pivotal role in urban climate resilience at the C40 Mayors Summit in Rio, Brazil. Partnering with the Poul Due Jensen Foundation, Grundfos advocated for integrating water into urban planning, leading to a dedicated session on water. Dieter Sauer, Sales Group Head, highlighted urban water resilience, stressing that 90% of climate impacts involve water. The delegation engaged in panel discussions, underscoring smart water management as key to social, economic, and climate resilience. Inês Breda emphasized Grundfos' mission to address water and climate challenges, improving quality of life globally.

Cotoperí Solar, the largest photovoltaic complex in Central America and the Caribbean, is inaugurated

Vice President Raquel Peña inaugurated Cotoperí Solar (162.6MWp), Central America and the Caribbean's largest photovoltaic complex, in Guaymate, La Romana. Comprising three solar plants, it will generate 286GWh annually, reducing 210,000 tons of CO_2 emissions. ACCIONA Energía holds 51%, while Cotosolar Holding owns 49%, including JMMB Sustainable Energy Fund and Grupo Pais. The project created 600+ jobs and boosted the local economy. Partnering with Centro Arcoíris and acciona.org, it enhances water and sanitation access for 4,500+ residents in Bajos de Haina. Cotoperí Solar strengthens ACCIONA's renewable portfolio in the Dominican Republic.

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